

In re Application of: GIBBINS, Bruce et al.  
Serial No.: 09/752,939  
Response to Office Action

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APR 28 2008

### AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An oxygen-delivery matrix, comprising, a biocompatible, single unit ~~construct cross-linked polyacrylamide matrix~~ capable of delivering oxygen, ~~wherein the polyacrylamide matrix is cross-linked prior to formation of closed cells of oxygen~~, comprising

- a) a swellable, cross-linked polyacrylamide polymer network,
- b) a catalyst ~~dispersed mixed within the matrix~~ cross-linked polyacrylamide polymer network, and
- c) oxygen in closed cells within the cross-linked matrix polyacrylamide polymer network substantially where the catalyst is present,

wherein during manufacture of the matrix, after the polyacrylamide polymer network is cross-linked, the oxygen is ~~formed~~ produced in closed cells within the matrix cross-linked polyacrylamide polymer network by reacting the catalyst ~~generating oxygen when contacted by~~ with a second reactant, such that decomposition of the second reactant results in oxygen in closed cells within the cross-linked polyacrylamide network, and wherein with use of the matrix, oxygen is transferred from the closed cells.

2. (Original) The matrix of Claim 1, further comprising at least one active agent.
3. (Canceled)
4. (Previously Presented) The matrix of Claim 1, wherein the oxygen delivery matrix further comprises a non-gellable polysaccharide.
5. (Canceled)
6. (Currently Amended) The matrix of Claim 1, wherein the second reactant oxygen is ~~formed from the decomposition~~ of a peroxide.

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7. (Canceled)

8. (Currently Amended) The matrix of Claim 1, wherein the catalyst is a carbonate salt, a salt of iodide, manganese dioxide, cupric chloride, feric chloride or an enzyme.

9-20. (Canceled)

21. (Currently Amended) The matrix of Claim 2, wherein the at least one active agent comprises gases, anti-microbial agents, anti-fungal agents, anti-bacterial agents, anti-viral agents, anti-parasitic agents, mycoplasma treatments, growth factors, proteins, nucleic acids, angiogenic factors, anesthetics, mucopolysaccharides, metals, pharmaceuticals, chemotherapeutic agents, herbicides, growth inhibitors, ~~anti-fungal agents, anti-bacterial agents, anti-viral agents, anti-parasitic agents,~~ wound healing agents, growth promoters, indicators of change in the environment, enzymes, nutrients, vitamins, minerals, carbohydrates, fats, fatty acids, nucleosides, nucleotides, amino acids, sera, antibodies and fragments thereof, lectins, immune stimulants, immune suppressors, coagulation factors, neurochemicals, cellular receptors, antigens, adjuvants, or radioactive materials.

22. (Previously Presented) The matrix of Claim 21, wherein the gases comprise nitrogen, carbon dioxide, and noble gases.

23. (Previously Presented) The matrix of Claim 21, wherein the anti-microbial agents comprises isoniazid, ethambutol, pyrazinamide, streptomycin, clofazimine, rifabutin, fluoroquinolones, ofloxacin, sparfloxacin, rifampin, azithromycin, clarithromycin, dapsone, tetracycline, erythromycin, ciprofloxacin, doxycycline, ampicillin, amphotericin B, ketoconazole, fluconazole, pyrimethamine, sulfadiazine, clindamycin, lincomycin, pentamidine, atovaquone, paromomycin, diclazaril, acyclovir, trifluorouridine, foscarnet, penicillin, gentamicin, ganciclovir, iatroconazole, miconazole, Zn-pyrithione, silver salts, chloride, bromide, iodide, or periodate.

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24. (Previously Presented) The matrix of Claim 21, wherein the growth factors comprise basic fibroblast growth factor, acidic fibroblast growth factor, nerve growth factor, epidermal growth factor, insulin-like growth factors 1 and 2, platelet derived growth factor, tumor angiogenesis factor, vascular endothelial growth factor, corticotropin releasing factor, transforming growth factors  $\alpha$  and  $\beta$ , interleukin-8, granulocyte-macrophage colony stimulating factor, interleukins, or interferons.

25. (Previously Presented) The matrix of Claim 21, wherein the mucopolysaccharides comprise heparin, heparin sulfate, heparinoids, dermatin sulfate, pentosan polysulfate, chondroitin sulfate, hyaluronic acid, cellulose, agarose, chitin, dextran, carrageenan, linoleic acid, or allantoin.

26. (Previously Presented) The matrix of Claim 21, wherein the proteins comprise collagen, cross-linked collagen, fibronectin, laminin, elastin, or cross-linked elastin.

27. (Previously Presented) The matrix of Claim 21, wherein the metals comprise zinc or silver.

28. (Previously Presented) The matrix of Claim 1, wherein the matrix comprises a stranded configuration.

29-30. (Canceled)

31. (Previously Presented) The matrix of Claim 1, further comprising a water loss control agent comprising petrolatum, glycolipids, ceramides, free fatty acids, cholesterol, triglycerides, sterylesters, cholesteryl sulfate, linoleic ethyl ester, or silicone oil.

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32. (Previously Presented) The matrix of Claim 1, further comprising a plasticizer comprising glycerol, water, propylene glycol, or butanol.
33. (Previously Presented) The matrix of Claim 1, further comprising a hydration control agent comprising isopropyl alcohol, ethanol, glycerol, butanol, or propylene glycol.
34. (Previously Presented) The matrix of Claim 4, wherein the non-gellable polysaccharide is guar gum.
35. (Previously Presented) The matrix of Claim 8, wherein the enzyme is catalase.
36. (Canceled)
37. (Canceled)
38. (Currently Amended) An ~~gas~~ oxygen delivery device, comprising a biocompatible, single unit ~~construct~~ cross-linked polyacrylamide matrix capable of delivering oxygen, comprising
- a) a swellable, cross-linked polyacrylamide polymer network,
  - b) a catalyst mixed within the cross-linked polyacrylamide polymer network,
  - c) oxygen in closed cells within the cross-linked polyacrylamide polymer network substantially where the catalyst is present,
  - d) at least one active agent
- wherein the cross-linked ~~matrix~~ polyacrylamide polymer network is ~~formed~~ cross-linked prior to ~~gas~~ oxygen formation, ~~comprising a swellable cross-linked polyacrylamide polymer network, at least one active agent, and a gas in closed cells formed in the matrix,~~ wherein the gas is oxygen, and the oxygen is ~~formed~~ produced by ~~the reaction of a reacting the~~ the catalyst and a second reactant within the matrix cross-linked polyacrylamide polymer network with a second reactant during the manufacture of the matrix to create multiple oxygen-rich closed cells within the cross-

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linked polyacrylamide polymer network of the matrix, wherein, with use of the matrix, oxygen is transferred from the closed cells.

39. (Currently Amended) ~~A gas delivery device, comprising a~~ A biocompatible, single unit ~~construct cross-linked polyacrylamide matrix, wherein the cross-linked polyacrylamide matrix is formed prior to gas formation,~~ comprising a swellable, cross-linked polyacrylamide polymer network, at least one active agent, a catalyst mixed within the cross-linked polyacrylamide polymer network, and oxygen in closed cells wherein the oxygen is formed produced within the cross-linked matrix polyacrylamide polymer network by the reaction of the catalyst and a second reactant, wherein the polyacrylamide polymer network is cross-linked prior to gas formation.

40. (New) The matrix of Claim 38, wherein the matrix further comprises a non-gellable polysaccharide.

41. (New) The matrix of Claim 38, wherein the second reactant is a peroxide.

42. (New) The matrix of Claim 38, wherein the catalyst is a carbonate salt, a salt of iodide, manganese dioxide, cupric chloride, ferric chloride, or an enzyme.

43. (New) The matrix of Claim 38, wherein the at least one active agent comprises gases, anti-microbial agents, anti-fungal agents, anti-bacterial agents, anti-viral agents, anti-parasitic agents, mycoplasma treatments, growth factors, proteins, nucleic acids, angiogenic factors, anesthetics, mucopolysaccharides, metals, pharmaceuticals, chemotherapeutic agents, herbicides, growth inhibitors, wound healing agents, growth promoters, indicators of change in the environment, enzymes, nutrients, vitamins, minerals, carbohydrates, fats, fatty acids, nucleosides, nucleotides, amino acids, sera, antibodies and fragments thereof, lectins, immune stimulants, immune suppressors, coagulation factors, neurochemicals, cellular receptors, antigens, adjuvants, or radioactive materials.

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44. (New) The matrix of Claim 43, wherein the gases comprise nitrogen, carbon dioxide, and noble gases.
45. (New) The matrix of Claim 43, wherein the anti-microbial agents comprises isoniazid, ethambutol, pyrazinamide, streptomycin, clofazimine, rifabutin, fluoroquinolones, ofloxacin, sparfloxacin, rifampin, azithromycin, clarithromycin, dapsone, tetracycline, erythromycin, ciprofloxacin, doxycycline, ampicillin, amphotericin B, ketoconazole, fluconazole, pyrimethamine, sulfadiazine, clindamycin, lincomycin, pentamidine, atovaquone, paromomycin, diclazaril, acyclovir, trifluorouridine, foscarnet, penicillin, gentamicin, ganciclovir, iatroconazole, miconazole, Zn-pyrrithione, silver salts, chloride, bromide, iodide, or periodate.
46. (New) The matrix of Claim 43, wherein the growth factors comprise basic fibroblast growth factor, acidic fibroblast growth factor, nerve growth factor, epidermal growth factor, insulin-like growth factors 1 and 2, platelet derived growth factor, tumor angiogenesis factor, vascular endothelial growth factor, corticotropin releasing factor, transforming growth factors  $\alpha$  and  $\beta$ , interleukin-8, granulocyte-macrophage colony stimulating factor, interleukins, or interferons.
47. (New) The matrix of Claim 43, wherein the mucopolysaccharides comprise heparin, heparin sulfate, heparinoids, dermatin sulfate, pentosan polysulfate, chondroitin sulfate, hyaluronic acid, cellulose, agarose, chitin, dextran, carrageenan, linoleic acid, or allantoin.
48. (New) The matrix of Claim 43, wherein the proteins comprise collagen, cross-linked collagen, fibronectin, laminin, elastin, or cross-linked elastin.
49. (New) The matrix of Claim 43, wherein the metals comprise zinc or silver.
50. (New) The matrix of Claim 38, wherein the matrix comprises a stranded configuration.

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51. (New) The matrix of Claim 38, further comprising a water loss control agent comprising petrolatum, glycolipids, ceramides, free fatty acids, cholesterol, triglycerides, sterylesters, cholesteryl sulfate, linoleic ethyl ester, or silicone oil.
52. (New) The matrix of Claim 38, further comprising a plasticizer comprising glycerol, water, propylene glycol, or butanol.
53. (New) The matrix of Claim 38, further comprising a hydration control agent comprising isopropyl alcohol, ethanol, glycerol, butanol, or propylene glycol.
54. (New) The matrix of Claim 40, wherein the non-gellable polysaccharide is guar gum.
55. (New) The matrix of Claim 42, wherein the enzyme is catalase.
56. (New) The matrix of Claim 39, wherein the matrix further comprises a non-gellable polysaccharide.
57. (New) The matrix of Claim 39, wherein the second reactant is a peroxide.
58. (New) The matrix of Claim 39, wherein the catalyst is a carbonate salt, a salt of iodide, manganese dioxide, cupric chloride, ferric oxide, or an enzyme.
59. (New) The matrix of Claim 39, wherein the at least one active agent comprises gases, anti-microbial agents, anti-fungal agents, anti-bacterial agents, anti-viral agents, anti-parasitic agents, mycoplasma treatments, growth factors, proteins, nucleic acids, angiogenic factors, anesthetics, mucopolysaccharides, metals, pharmaceuticals, chemotherapeutic agents, herbicides, growth inhibitors, wound healing agents, growth promoters, indicators of change in the environment, enzymes, nutrients, vitamins, minerals, carbohydrates, fats, fatty acids, nucleosides, nucleotides, amino acids, sera, antibodies and fragments thereof, lectins, immune

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stimulants, immune suppressors, coagulation factors, neurochemicals, cellular receptors, antigens, adjuvants, or radioactive materials.

60. (New) The matrix of Claim 59, wherein the gases comprise nitrogen, carbon dioxide, and noble gases.

61. (New) The matrix of Claim 59, wherein the anti-microbial agents comprises isoniazid, ethambutol, pyrazinamide, streptomycin, clofazimine, rifabutin, fluoroquinolones, ofloxacin, sparfloxacin, rifampin, azithromycin, clarithromycin, dapsone, tetracycline, erythromycin, ciprofloxacin, doxycycline, ampicillin, amphotericin B, ketoconazole, fluconazole, pyrimethamine, sulfadiazine, clindamycin, lincomycin, pentamidine, atovaquone, paromomycin, diclazaril, acyclovir, trifluorouridine, foscarnet, penicillin, gentamicin, ganciclovir, iatroconazole, miconazole, Zn-pyrrithione, silver salts, chloride, bromide, iodide, or periodate.

62. (New) The matrix of Claim 59, wherein the growth factors comprise basic fibroblast growth factor, acidic fibroblast growth factor, nerve growth factor, epidermal growth factor, insulin-like growth factors 1 and 2, platelet derived growth factor, tumor angiogenesis factor, vascular endothelial growth factor, corticotropin releasing factor, transforming growth factors  $\alpha$  and  $\beta$ , interleukin-8, granulocyte-macrophage colony stimulating factor, interleukins, or interferons.

63. (New) The matrix of Claim 59, wherein the mucopolysaccharides comprise heparin, heparin sulfate, heparinoids, dermatin sulfate, pentosan polysulfate, chondroitin sulfate, hyaluronic acid, cellulose, agarose, chitin, dextran, carrageenan, linoleic acid, or allantoin.

64. (New) The matrix of Claim 59, wherein the proteins comprise collagen, cross-linked collagen, fibronectin, laminin, elastin, or cross-linked elastin.

65. (New) The matrix of Claim 59, wherein the metals comprise zinc or silver.



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66. (New) The matrix of Claim 39, wherein the matrix comprises a stranded configuration.

67. (New) The matrix of Claim 39, further comprising a water loss control agent comprising petrolatum, glycolipids, ceramides, free fatty acids, cholesterol, triglycerides, sterylesters, cholesteryl sulfate, linoleic ethyl ester, or silicone oil.

68. (New) The matrix of Claim 39, further comprising a plasticizer comprising glycerol, water, propylene glycol, or butanol.

69. (New) The matrix of Claim 39, further comprising a hydration control agent comprising isopropyl alcohol, ethanol, glycerol, butanol, or propylene glycol.

70. (New) The matrix of Claim 56, wherein the non-gellable polysaccharide is guar gum.

71. (New) The matrix of Claim 58, wherein the enzyme is catalase.